

3/10/08

## DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final

2/5/99

### RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA750)

#### Migration of Contaminated Groundwater Under Control

Facility Name: Equistar Chemical Tuscola  
Facility Address: 625 East Highway 36, Tuscola, Illinois  
Facility EPA ID #: ILD 005 078 126

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

X If yes - check here and continue with #2 below.  
\_\_\_ If no - re-evaluate existing data, or  
\_\_\_ If data are not available skip to #6 and enter "IN" (more information needed) status code.

#### BACKGROUND

##### Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

##### Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

##### Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

##### Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).



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2. Is **groundwater** known or reasonably suspected to be "**contaminated**"<sup>1</sup> above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

  X   If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

       If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

       If unknown - skip to #8 and enter "TN" status code.

Rationale and Reference(s):

MW03S Area

Groundwater in the area of MW03S is contaminated with VOCs, specifically benzene, cis-1,2-dichloroethene, and vinyl chloride.

Areas of Concern

Of the eleven areas of concern, VOC contamination is present at the Former Tubular Water Reactor Area, Chemical Loading Area, Former Polyethylene Production Area, and the Former Ethylene Production Area.

Comprehensive Site Investigation/Remediation Objective Report, September 2005 (CSI 2005): Tables 5 to 7 present COC and concentrations that exceed the Illinois Class 2 Groundwater Standards in groundwater (direct groundwater ingestion pathway).

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<sup>1</sup> "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).



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3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"<sup>2</sup> as defined by the monitoring locations designated at the time of this determination)?

- ☒ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"<sup>2</sup>.
- ☐ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"<sup>2</sup>) - skip to #8 and enter "NO" status code, after providing an explanation.
- ☐ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Contaminated groundwater at the four AOCs noted previously is bounded by downgradient wells with no detections of VOC (G125, G110, G111, R113, G127, MW20, MW21, MW19, MW31). See also Page 9 and Figure 17 of the CSI 2005.

Groundwater contamination in the MW03S area discharges to the on-site Freshwater Lake.

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<sup>2</sup> "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.



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4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

  X   If yes - continue after identifying potentially affected surface water bodies.

       If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

       If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Groundwater contamination in the MW03S area discharges to the on-site Freshwater Lake. See Figures 16 and 20 of the CSI 2005.





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5. Is the **discharge** of "contaminated" groundwater into surface water likely to be "**insignificant**" (i.e., the maximum concentration<sup>3</sup> of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

\_\_\_\_\_ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

  X   If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations<sup>3</sup> greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

\_\_\_\_\_ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

MW14 lies on the shoreline of the Freshwater Lake. July 2005 concentrations of vinyl chloride slightly exceeded 10 times the Illinois EPA Class II Groundwater Remediation Objectives.

	10x Class II GRO	MW14
Benzene	0.25 mg/L	0.085 mg/L
Cis-1,2-DCE	2.00 mg/L	0.96 mg/L
Vinyl Chloride	0.1 mg/L	0.17 mg/L

See Figure 20 of the CSI 2005.

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<sup>3</sup> As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.



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6. Can the discharge of "contaminated" groundwater into surface water be shown to be "currently acceptable" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented<sup>4</sup>)?

  X   If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,<sup>5</sup> appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

       If no - (the discharge of "contaminated" groundwater can not be shown to be "currently acceptable") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

       If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):

The elevated level of vinyl chloride discharging to the Freshwater Lake is below the Illinois EPA advisory Acute and Chronic Toxicity Criterion of 4 mg/L. Surface water samples were non-detect for organics. Groundwater impacts in this area will be monitored under the IEPA's Site Remediation Program to characterize the relationship between groundwater and surface water quality.

See section 5 of the CSI 2005; Derived Water Quality Criteria (<http://www.epa.state.il.us/water/water-quality-standards/water-quality-criteria.html>)

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<sup>4</sup> Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

<sup>5</sup> The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.



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7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

  X   If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

       If no - enter "NO" status code in #8.

       If unknown - enter "IN" status code in #8.

**Rationale and Reference(s):**

Groundwater impacts in the MW03S Area will be monitored under Illinois EPA's SRP to characterize the relationship between groundwater and surface water quality.

Groundwater impacts for the AOCs will be resolved through the Illinois EPA SRP. Additional monitoring and/or evaluations will be required to achieve regulatory closure through the TACO pathway exclusion process.



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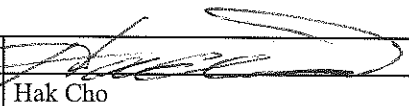
8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

  X   YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Equistar Chemical facility, EPA ID # ILD 005 078 126, located at 625 East US Highway 36, Tuscola, Illinois. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

       NO - Unacceptable migration of contaminated groundwater is observed or expected.

       IN - More information is needed to make a determination.

Completed by	(signature)		Date	
	(print)	Peter Ramanauskas		
	(title)	Environmental Scientist		

Supervisor	(signature)		Date	3/10/08
	(print)	Hak Cho		
	(title)	WPTD WMB CAS Chief		
	(EPA Region or State)	Region 5		

Locations where References may be found:
USEPA Region 5 77 W. Jackson Blvd (DW-8J) 7th Floor RCRA Fileroom Chicago, IL 60604
Tuscola Public Library 112 East Sale Street Tuscola, IL 61953

Contact telephone and e-mail numbers

(name)	Peter Ramanauskas ramanauskas.peter@epa.gov
(phone #)	312-886-7890







Peter  
Ramanauskas /R5/USEPA/US  
10/10/2006 01:35 PM

To david.guier@lyondell.com  
cc Cho.Hak@EPAMAIL.EPA.GOV@EPA, Jim Moore  
<Jim.Moore@epa.state.il.us>  
bcc

Subject Tuscola CA750

Distribution <david.guier@lyondell.com>,  
List <Jim.Moore@epa.state.il.us>,  
Cho.Hak@EPAMAIL.EPA.GOV@EPA

Hi David,

I wanted to let you know that you will be receiving a letter from us shortly which discusses the agreement we've made for you to work with IEPA. I apologize for being so late with this. I had a version of the letter dated July 2005 and I thought it had gone out, but I apparently got sidetracked.

This email will also serve notice that we accept the CA 750 determination for the Tuscola facility.

Please let me know if you have questions.

Thanks,  
Peter



September 19, 2005

Mr. Peter Ramanauskas  
Environmental Scientist  
United States Environmental Protection Agency Region 5  
77 West Jackson Boulevard (DW-8J)  
Chicago, IL 60604-3590

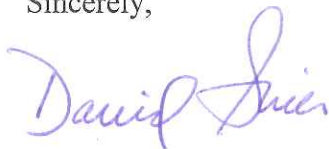
Subject: Tuscola (IL) Plant  
ILD005078126

Dear Mr. Ramanauskas:

Equistar Chemicals (Equistar) appreciates the United States Environmental Protection Agency (USEPA) meeting on September 1, 2005 to discuss the draft CSI report and Documentation of Environmental Indicator (EI) Determination: 750 EI Checklist. The final versions of both documents are attached. These documents have been amended to reflect your comments, as well as additional evaluations triggered by the comments. Equistar will also provide (via email) a copy of the 750 EI Checklist.

Please contact me at (713) 309-7794 if you have any questions, or need any additional information.

Sincerely,



David Guier  
Retained Liabilities & Remediation Program Manager

Attachments: CSI Report  
750 EI Checklist

Cc: Jim Moore-IEPA w/o attachment  
Terri Blake Myer-IEPA w/o attachment  
Suda Arakere-Equistar  
Jason Pontnack-Equistar  
Harry Walton w/o attachment  
Stu Cravens w/o attachment  
Jill Witts w/o attachment



**DRAFT**  
**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**  
Interim Final 2/5/99  
RCRA Corrective Action  
Environmental Indicator (EI) RCRIS code (CA750)  
Migration of Contaminated Groundwater under Control

Facility Name: **Equistar Chemical Tuscola**  
Facility Address: **625 East US Highway 36, Tuscola, Illinois**  
Facility EPA ID #: **ILD005078126**

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?  
☒   X   If yes - check here and continue with #2 below.  
☐ If no - re-evaluate existing data, or  
☐ if data are not available, skip to #8 and enter "IN" (more information needed) status code.

**BACKGROUND**

Definition of Environmental Indicators (for the RCRA Corrective Action)

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Definition of "Migration of Contaminated Groundwater under Control" EI

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Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993,



GPRA). The "Migration of Contaminated Groundwater under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

#### Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information). Migration of Contaminated Groundwater under Control Environmental Indicator (EI) RCRIS code (CA750)

### ***SUMMARY OF SITE INFORMATION***

#### Reference:

COMPREHENSIVE SITE INVESTIGATION/REMEDATION OBJECTIVE REPORT  
ILD005078126 – Douglas County – 041808002, Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Hwy 36 / Tuscola, Illinois, Equistar Chemical, L.P., Harry R. Walton et.al., Dated September 15, 2005. (CSI 2005).

Note: The CSI 2005 summarized and referenced all of the previous reports/documents submitted to USEPA that were utilized in the CSI 2005 evaluations. Several of these are again referenced to provide link to data.

Previous environmental investigative activities have been conducted as part of the Post-Closure Care Permits for the closed landfills and the Voluntary Corrective Action Agreement (VCAA) between the USEPA and Equistar. Numerous quarterly and annual groundwater monitoring reports for the closed landfills have been prepared for the Site, along with a number of Supplemental Permit Applications. Under the VCAA, a Resource Conservation and Recovery Act (RCRA) facility investigation and supplemental work were conducted. Based on these studies, the following areas of concern are addressed in the Report:

- Closed Landfills
- Kaskaskia River
- Wastewater Treatment Ponds (WWTPs)
- MW03S Area Groundwater
- Closed WWTPs
- Areas of Potential Concern (AOCs)

These areas are outlined in CSI 2005 Figure 2. The current land use of the Site is industrial/commercial. Engineered barriers including building, paved





roadways, and paved parking areas cover land surfaces in the southern half of the Site. Based on the information provided by the property owner, the future land use will be an industrial/commercial land use classification. Implementation of institutional controls for this land use will be through the Illinois EPA Site Remediation Program (SRP) pursuant to TACO (35 IAC Part 742: Subpart J).

### **Closed Landfills**

The three-year post-closure groundwater monitoring program was initiated in October 1994 at the Closed Landfill Areas. The post-closure groundwater monitoring program identified a confined statistically significant increase of constituents of concern originating from the Closed Landfill Areas. Equistar, as required, notified the Illinois EPA regarding this determination in June 1998. Groundwater assessment activities have been ongoing since that time.

As part of the groundwater assessment program, 19 compliance wells and 14 assessment monitoring wells have been installed around the Closed Landfill Areas (CSI 2005 Figure 4a). The compliance wells are monitored on a quarterly basis and the assessment wells are monitored on an annual basis. Sulfate, total dissolved solids (TDS), boron, and iron are the main constituents that are impacting groundwater above Illinois Class II groundwater standards. Groundwater monitoring has defined the extent of migration of contaminated groundwater.

**The Closed Landfill Areas will continue to be regulated under 35 Illinois Administrative Code (IAC) Part 807 at the direction of the Illinois EPA Bureau of Land. Investigations and the long-term groundwater program results (CSI 2005 Figure 17: Summary of Extent of Contamination Above State of Illinois Class II Groundwater Standards) have documented that the migration of contaminated groundwater is under control, and that monitoring is conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater.**

### **Kaskaskia River**

Reference: Ecological Risk Evaluation, Kaskaskia River Sediments, Millennium Petrochemicals, Inc., Equistar Chemicals, LP – Tuscola Plant, Tuscola, Illinois. Prepared for Clayton Group Services, Inc. Prepared by SLR International Corp. Dated February 13, 2002.

The Kaskaskia River is located along the western property boundary of the Facility (CSI 2005 Figure 1). Equistar draws fresh water from the Kaskaskia River for process water and cooling water and discharges treated water back to the Kaskaskia River per their National Pollution Discharge Elimination System (NPDES) permit (Permit Number IL0000141). Equistar has investigated the surface water and sediments of the Kaskaskia River and the inlet and outlet channels to the facility as part of an Environmental Indicators investigation and follow-on work.



As part of the Environmental Indicators (EI) Investigation, an ecological inventory of the Kaskaskia River, the Site, and the surrounding area was conducted. The ecological inventory indicated that a diverse group of aquatic life including fish, amphibians, waterfowl, mollusks, macroinvertebrates, and aquatic animals is found in the Kaskaskia River. The portions of the Kaskaskia River within the study area appear to be in good condition and are not affected by the Site. Bioassays conducted on Kaskaskia River sediments indicated that polycyclic aromatic hydrocarbons (PAHs) and metals found in sediment samples are unlikely to cause toxicity to endemic sediment-dwelling organisms, including mussels, in the area near the Site.

**Based on the above referenced investigations, it was determined that the Facility has not negatively impacted the river and no further action is necessary to address potential impacts by the Facility to the Kaskaskia River.**

### **Wastewater Treatment Ponds**

The WWTPs are located in the northwest section of the Site, near Freshwater Lake (CSI 2005 Figures 2 and 19). Freshwater Lake and the six sludge treatment lagoons east of the lake were constructed in 1952. These six lagoons are discussed in Section 5, "Closed Wastewater Treatment Ponds", of the CSI 2005.

A separate set of ponds, called the Low, Middle and High Ponds, are located north and northeast of Freshwater Lake and were constructed between 1954 and 1979 (Figures 2 and 19). In 1954, middle sludge ponds 1 through 6 and low sludge ponds 7 and 8 were constructed. In 1959, high sludge ponds 7 through 10 were completed. In approximately 1961, high sludge ponds 11 through 18 were constructed. By 1979, high ponds 19 and 20 were constructed.

The WWTPs function as settling and oxidation ponds for the treatment of industrial, sanitary, and storm water discharges from the Site. In general, the high ponds serve two roles: diversion capacity and solids storage. Four of the high ponds (by-pass ponds) can be used to divert wastewater that would have entered the treatment plant. The remaining ponds receive solids from the primary clarifier at the treatment plant. The solids settle out in these ponds, and some water is decanted back to the middle ponds. The middle ponds receive the initial discharge of wastewater from the primary clarifier, among other sources. The water is then progressively transferred from the middle ponds into the low ponds prior to eventual discharge into the Kaskaskia River. Investigations summarized in the CSI 2005 document that the permitted discharge is not impacting the biotic community in the Kaskaskia River.

Groundwater monitoring wells MW05 shallow, MW05 Deep, MW06 shallow, MW06 Deep, MW07 shallow, and MW07 deep (CSI 2005 Figure 4a) were installed downgradient of the WWTPs. These monitoring wells were sampled for



potential contaminants of concern. Results did not confirm the presence of contaminants above groundwater standards. (Final Environmental Indicators (EI) Report. Millennium Petrochemicals, Inc., ILD005078126 – Douglas County – 041808002, Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Hwy 36 / Tuscola, Illinois. Prepared for Millennium Petrochemicals, Inc. Prepared by Clayton Group Services, Inc. Dated October 31, 2001).

Data from the groundwater monitoring wells installed between the WWTPs and the Kaskaskia River and at the Site AOCs (CSI 2005 Figure 17: Summary of Extent of Contamination Above State of Illinois Class II Groundwater Standards) document that groundwater impacts are limited in area at the WWTPs and migration of contaminated groundwater is under control.

The WWTPs are currently regulated under NPDES Permit Number IL0000141. As such, any investigative and/or remedial activities (if required) for the WWTPs will be conducted under the direction of the Illinois EPA Bureau of Water. Equistar is currently in discussions with the Bureau of Water to develop a groundwater monitoring plan for the WWTPs.

#### **Closed Wastewater Treatment Ponds**

Six wastewater treatment ponds located east of Freshwater Lake (CSI 2005 Figures 2 and 18) were constructed in 1952. Between 1983 and 1986, four of the six WWTPs (WWTPs 1, 4, 5, and 6) were closed. The active ponds (WWTPs 2 and 3) are periodically dredged to maintain their capacity. These WWTPs were sampled during the EI and the MW03S Area investigations.

Soil samples collected in the ponds (CSI 2005 Figure 18) indicate that the closed ponds were backfilled with silty clay fill and sand and that there is residual sludge material in the ponds. Low levels of VOCs were detected in fill samples collected from the Closed WWTPs. Based on the presence of residual sludge in the Closed WWTPs and the presence of VOCs in the fill material, a feasibility study will be developed to evaluate potential alternatives for the proper closure of these WWTPs. Alternatives to be considered will include excavation with land-farming or off-site disposal. Potential groundwater impacts near the Closed WWTPs are discussed in below in MW03S Area.

**Data for closed WWTPs, MW03S Area and from the Site (CSI 2005 Figure 17: Summary of Extent of Contamination above State of Illinois Class II Groundwater Standards) have documented that the migration of contaminated groundwater is under control.**

#### **MW03S Area Groundwater**

The nature and extent of groundwater impact in the MW03S Area (CSI 2005 Figures 2 and 20) has been documented in a series of investigations.



Data indicates COCs in groundwater do not present chronic risk to the biotic community in the Freshwater Lake (groundwater pathway receptor).

	MW03			MW14		
	Benzene	DEC	VC	Benzene	DEC	VC
08/03	8.1	2.9	0.48	0.27	1.3	0.3
11/03	1.5	0.28	0.15	1.9	1.8	0.57
02/04	1.8	0.24	0.20	3.7	3.1	0.77
05/04	1.9	0.140	0.18	2.7	2.0	0.55
07/05	0.330	0.080	0.031	0.085	0.96	0.17
Class 2 RO	0.025	0.20	0.01			
Surface						
Water RO	0.860*	1.10**	4.0**			

\* Illinois Surface Water Quality Standards (35 IAC Part 302)

\*\*Derived Water Quality Criteria (<http://www.epa.state.il.us/water/water-quality-standards/water-quality-criteria.html>)

***Data for the MW03S Area and from the Site (CSI 2005 Figure 17: Summary of Extent of Contamination above State of Illinois Class II Groundwater Standards) have documented that the migration of contaminated groundwater is under control. Monitoring will be conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater. Groundwater impacts in the MW03S Area will be monitored under Illinois EPA's SRP to characterize the relationship between groundwater and surface water quality.***

#### **Areas Of Concern (AOCs)**

Investigations to define the nature and extent of COCs at the Site, including the eleven AOCs, were completed in July-August 2003 by Clayton and July -August 2005 by the Project Team. The eleven AOCs are listed below and the locations are presented in CSI 2005 Figure 3:

- Former Extraction Process Area (EX Area)
- Former Fractionation Process Area (FP Area)
- Former Ethylene Production Area (ET Area)
- Former Polyethylene Production Area (PE Area)
- Former Agricultural Chemical Area (AG Area)
- Former Fire Training Area (FT Area)
- Former Polymer Pilot Plant Area (PP Area)
- Chemical Loading Area (CL Area)
- Former Ethyl Chloride Production Area (EC Area)
- Former Tubular Water Reactor Area (TWR Area)
- North Uploading Area (NU Area)





Soil and groundwater samples were analyzed in an effort to characterize the nature and extent of potential subsurface impacts at these former production areas. The investigations conducted at each AOC were sufficient to define the extent and nature of COCs. A summary of the number of soil samples, monitoring wells, and soil/groundwater analytes at each AOC is provided in CSI 2005 Table 12. Groundwater monitoring data (CSI 2005 Tables 5-7) from the monitoring wells associated with the AOCs (CSI 2005 Figure 4b) document current groundwater quality conditions.

The conditions established for the eleven AOCs at the Site for the TACO evaluation were:

- Current and future land use is industrial/commercial with a construction worker scenario.
- Potential use of institutional controls for the Site to exclude pathways:
  - Industrial/commercial land use restrictions;
  - Worker protection notification; and
  - Installation and maintenance of engineered barriers.
- COCs are select PAHs, VOCs, TPH and metals.
- Pathways of concern: ingestion, inhalation, soil to groundwater and direct ingestion of groundwater.
- Groundwater is a Class II resource.
- Groundwater quality data from wells associated with the eleven AOCs document contaminant concentrations in areas downgradient and lateral gradient to the AOCs were less than Class II Standards and above Class II standards within portions of 7 of the 11 AOCs (CSI 2005 Figure 17).
- TACO evaluation of the maximum potential extent of contaminants is similar to distribution presented in CSI 2005 Figure 17.
- Groundwater compliance point or receptor locations are Equistar property boundaries.
- Groundwater and surface water receptors are not at risk from any of the eleven AOC contaminants.



2. Is groundwater known or reasonably suspected to be "contaminated"<sup>1</sup> above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

- ☒ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.
- ☐ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."
- ☐ If unknown - skip to #8 and enter "IN" status code.

**Rationale:**

CSI 2005: Tables 13a/b to 23a/b present by AOC the COCs and concentrations that exceed the Illinois Class 2 Groundwater Standards in the soil to groundwater pathway. CSI 2005: Tables 5 to 7 present COC and concentrations that exceed the Illinois Class 2 Groundwater Standards in groundwater (direct groundwater ingestion pathway).

**Reference:**

CSI 2005

**Footnotes:**

<sup>1</sup>"Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses). Migration of Contaminated Groundwater Under Control Environmental Indicator (EI) RCRIS code (CA750)



3. Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"2 as defined by the monitoring locations designated at the time of this determination)?

- X   If yes - continue, after presenting or referencing the physical evidence (e.g. groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"2).
- If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"2) - skip to #8 and enter "NO" status code, after providing an explanation.
- If unknown - skip to #8 and enter "IN" status code.

**Rationale:**

**Closed Landfills**

The three-year post-closure groundwater monitoring program was initiated in October 1994 at the Closed Landfill Areas. The post-closure groundwater monitoring program identified a confined statistically significant increase of constituents of concern originating from the Closed Landfill Areas. Equistar, as required, notified the Illinois EPA regarding this determination in June 1998. Groundwater assessment activities have been ongoing since that time.

As part of the groundwater assessment program, 19 compliance wells and 14 assessment monitoring wells have been installed around the Closed Landfill Areas (CSI 2005 Figure 4a). The compliance wells are monitored on a quarterly basis and the assessment wells are monitored on an annual basis. Sulfate, total dissolved solids (TDS), boron, and iron are the main constituents that are impacting groundwater above Class II groundwater standards. Groundwater monitoring has defined the extent of migration of contaminated groundwater. Groundwater monitoring data from 1998 to 2004 indicate that the extent of groundwater impact (CSI 2005 Figure 17) is stable.

**Kaskaskia River**

Based on the investigations, it was determined that the Facility groundwater impact has not negatively impacted the river and no further action is necessary to address potential impacts by the Facility to the Kaskaskia River.



### Wastewater Treatment Ponds

Groundwater monitoring results did not confirm the presence of contaminants above groundwater standards. Equistar is currently in discussions with the Illinois EPA Bureau of Water to develop a groundwater monitoring plan for the WWTPs.

### Closed Wastewater Treatment Ponds

See MW03S Area Groundwater

### MW03S Area Groundwater

Data indicates COCs in groundwater do not present chronic risk to the biotic community in the Freshwater Lake (groundwater pathway receptor).

	MW03 <i>DCE</i>			MW14 <i>DCE</i>		
	Benzene	DEC	VC	Benzene	DEC	VC
08/03	8.1	2.9	0.48	0.27	1.3	0.3
11/03	1.5	0.28	0.15	1.9	1.8	0.57
02/04	1.8	0.24	0.20	3.7	3.1	0.77
05/04	1.9	0.140	0.18	2.7	2.0	0.55
07/05	0.330	0.080	0.031	0.085	0.96	0.17
Class 2 RO	0.025	0.20	0.01			
Surface						
Water RO	0.860*	1.10**	4.0**			

\* Illinois Surface Water Quality Standards (35 IAC Part 302)

\*\*Derived Water Quality Criteria (<http://www.epa.state.il.us/water/water-quality-standards/water-quality-criteria.html>)

Monitoring will be conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater. Groundwater impacts in the MW03S Area will be monitored under Illinois EPA's SRP to characterize the relationship between groundwater and surface water quality.

### Areas Of Concern (AOCs)

Current concentrations of COCs in soil and groundwater at the 11 AOCs were evaluated using the Tier 2 Equation R12 and R26 evaluations, respectively (IAC Section 742. Appendix C: Table C RBCA Equations) to predict downgradient distance the contaminant concentrations achieve the Tier 1 remedial objectives (Illinois Class 2 Groundwater Standards). The input base parameters for Equations R12 and R26 are very protective. The equations are based on the following base characteristics that provide very conservative evaluation results:

- infinite source contamination (i.e., contaminant concentrations at the release site do not decrease over time),





- infinite migration (time) (i.e., actual monitoring results may not indicate downgradient contamination, but prediction results provide possible future contamination downgradient of the release site), and
- receptor characteristic (i.e., groundwater source from land surface down without a lower vertical limit).

The evaluations characterized the maximum potential extent of COC migration at the Site. The maximum extent of migration for any COC at any AOC was less than 36 meters (CSI 2005 Figure 16). Groundwater impacts for the AOCs will be resolved through the Illinois EPA SRP. Additional monitoring and/or evaluations will be required to achieve regulatory closure through the TACO pathway exclusion process.

**Reference(s):**

2005 CSI Sections 4, 5, and 6

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2 "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation. Migration of Contaminated Groundwater Under Control Environmental Indicator (EI) RCRIS code (CA750)



Does "contaminated" groundwater discharge into surface water bodies? 4.

- ☒ If yes - continue after identifying potentially affected surface water bodies.  
☐ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.  
☐ If unknown - skip to #8 and enter "IN" status code.

**Rationale:**

Site investigation indicated the groundwater from the MW03s area is discharging into the Freshwater Lake. Current data indicate COCs in groundwater do not present chronic risk to the biotic community in the Freshwater Lake (groundwater pathway receptor).

	MW03			MW14		
	Benzene	DEC	VC	Benzene	DEC	VC
08/03	8.1	2.9	0.48	0.27	1.3	0.3
11/03	1.5	0.28	0.15	1.9	1.8	0.57
02/04	1.8	0.24	0.20	3.7	3.1	0.77
05/04	1.9	0.140	0.18	2.7	2.0	0.55
07/05	0.330	0.080	0.031	0.085	0.96	0.17
Class 2 RO	0.025	0.20	0.01			
Surface						
Water RO	0.860*	1.10**	4.0**			

\* Illinois Surface Water Quality Standards (35 IAC Part 302)

\*\*Derived Water Quality Criteria (<http://www.epa.state.il.us/water/water-quality-standards/water-quality-criteria.html>)

Monitoring will be conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater. Groundwater impacts in the MW03S Area will be monitored under Illinois EPA's SRP to characterize the relationship between groundwater and surface water quality.

**Reference(s):**

CSI 2005\_



5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration<sup>3</sup> of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

- X   If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.
- If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations<sup>3</sup> greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.
- If unknown - enter "IN" status code in #8.

**Rationale:**

MW03s Area

Current data indicate COCs in groundwater do not present chronic risk to the biotic community in the Freshwater Lake (groundwater pathway receptor).



	MW03			MW14		
	Benzene	DEC	VC	Benzene	DEC	VC
08/03	8.1	2.9	0.48	0.27	1.3	0.3
11/03	1.5	0.28	0.15	1.9	1.8	0.57
02/04	1.8	0.24	0.20	3.7	3.1	0.77
05/04	1.9	0.140	0.18	2.7	2.0	0.55
07/05	0.330	0.080	0.031	0.085	0.96	0.17
Class 2 RO	0.025	0.20	0.01			
Surface						
Water RO	0.860*	1.10**	4.0**			

\* Illinois Surface Water Quality Standards (35 IAC Part 302)

\*\*Derived Water Quality Criteria (<http://www.epa.state.il.us/water/water-quality-standards/water-quality-criteria.html>)

#### Reference(s):

CSI 2005

3 As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone. Migration of Contaminated Groundwater Under Control

Class 2 RO 4.0

Benzene 0.025 mg/L

DEC = 0.20 mg/L

VC = 0.01 mg/L

MW14

0.085 mg/L

0.96 mg/L

0.17





6. Can the discharge of "contaminated" groundwater into surface water be shown to be "currently acceptable" 6. (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented4)?

  X   If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,5 appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

       If no - (the discharge of "contaminated" groundwater can not be shown to be "currently acceptable") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

       If unknown - skip to 8 and enter "IN" status code.

**Rationale:**

Current data indicate COCs in groundwater do not present chronic risk to the biotic community in the Freshwater Lake (groundwater pathway receptor).



	MW03			MW14		
	Benzene	DEC	VC	Benzene	DEC	VC
08/03	8.1	2.9	0.48	0.27	1.3	0.3
11/03	1.5	0.28	0.15	1.9	1.8	0.57
02/04	1.8	0.24	0.20	3.7	3.1	0.77
05/04	1.9	0.140	0.18	2.7	2.0	0.55
07/05	0.330	0.080	0.031	0.085	0.96	0.17
Class 2 RO	0.025	0.20	0.01			
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Water RO	0.860*	1.10**	4.0**			

\* Illinois Surface Water Quality Standards (35 IAC Part 302)

\*\*Derived Water Quality Criteria (<http://www.epa.state.il.us/water/water-quality-standards/water-quality-criteria.html>)

#### Reference(s):

CSI 2005

4 Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies. 5 The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.



7. Will groundwater monitoring / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

  X   If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

       If no - enter "NO" status code in #8.

       If unknown - enter "IN" status code in #8.

**Rationale:**

The Closed Landfill Areas will continue to be regulated under 35 Illinois Administrative Code (IAC) Part 807 at the direction of the Illinois EPA Bureau of Land. Investigations and the long-term groundwater program results (CSI 2005 Figure 17: Summary of Extent of Contamination Above State of Illinois Class II Groundwater Standards) have documented that the migration of contaminated groundwater is under control, and that monitoring is conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater.

The WWTPs are currently regulated under NPDES Permit Number IL0000141. As such, any investigative and/or remedial activities (if required) for the WWTPs will be conducted under the direction of the Illinois EPA Bureau of Water. Equistar is currently in discussions with the Bureau of Water to develop a groundwater monitoring plan for the WWTPs.

Groundwater impacts in the MW03S Area will be monitored under Illinois EPA's SRP to characterize the relationship between groundwater and surface water quality until the groundwater pathway is excluded through TACO process.

Current concentrations of COCs in soil and groundwater at the 11 AOCs were evaluated using the Tier 2 Equation R12 and R26 evaluations, respectively (IAC Section 742. Appendix C: Table C RBCA Equations) to predict downgradient distance the contaminant concentrations achieve the Tier 1 remedial objectives (Illinois Class 2 Groundwater Standards). The input base parameters for Equations R12 and R26 are very protective. The equations are based on the following base characteristics that provide very conservative evaluation results:



- infinite source contamination (i.e., contaminant concentrations at the release site do not decrease over time),
- infinite migration (time) (i.e., actual monitoring results may not indicate downgradient contamination, but prediction results provide possible future contamination downgradient of the release site), and
- receptor characteristic (i.e., groundwater source from land surface down without a lower vertical limit).

The evaluations characterized the maximum potential extent of COC migration at the Ssite. The maximum extents of migration for any COC at any AOC are present in CSI 2005 Figure 17. Groundwater impacts for the AOCs will be resolved through the Illinois EPA SRP. Additional monitoring and/or evaluations will be required to achieve regulatory closure through the TACO pathway exclusion process.

**Reference(s):**

CSI 2005





8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

- YE Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, It has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the facility, EPA ID # ILD005078126, located at Equistar Chemical, Tuscola. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.
- \_\_\_\_\_ NO - Unacceptable migration of contaminated groundwater is observed or expected.
- \_\_\_\_\_ IN - More information is needed to make a determination.

Date \_\_\_\_\_ Completed by (signature)  
(print)  
(title)  
Date \_\_\_\_\_ Supervisor (signature)  
(print)  
(title)  
(EPA Region or State)

Locations where References may be found:

CSI 2005 References in Chronological Order

- Work Plan for RCRA Facility Investigation. Millennium Petrochemicals, Inc., Tuscola, Illinois, ILD005078126. Prepared for Millennium Petrochemicals, Inc. Prepared by Clayton Group Services, Inc. Dated October 27, 2000.
- Final Environmental Indicators (EI) Report. Millennium Petrochemicals, Inc., ILD005078126 – Douglas County – 041808002, Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Hwy 36 / Tuscola, Illinois. Prepared for Millennium Petrochemicals, Inc. Prepared by Clayton Group Services, Inc. Dated October 31, 2001.



- Ecological Risk Evaluation, Kaskaskia River Sediments, Millennium Petrochemicals, Inc., Equistar Chemicals, LP – Tuscola Plant, Tuscola, Illinois. Prepared for Clayton Group Services, Inc. Prepared by SLR International Corp. Dated February 13, 2002.
- Assessment of Additional Areas of Concern. Millennium Petrochemicals, Inc., ILD005078126 – Douglas County – 041808002, Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Hwy 36 / Tuscola, Illinois. Prepared for Millennium Petrochemicals, Inc. Prepared by Clayton Group Services, Inc. Dated March 28, 2003.
- MW03S Area Investigation Report. Millennium Petrochemicals, Inc., ILD005078126 – Douglas County – 041808002, Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Hwy 36 / Tuscola, Illinois. Prepared for Millennium Petrochemicals, Inc. Prepared by Clayton Group Services, Inc. Dated May 15, 2003.
- Addendum to Assessment of Additional Areas of Concern. Millennium Petrochemicals, Inc., ILD005078126 – Douglas County – 041808002, Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Hwy 36 / Tuscola, Illinois. Prepared for Millennium Petrochemicals, Inc. Prepared by Clayton Group Services, Inc. Dated June 30, 2003.
- Reply to U.S. EPA Comments on the MW03S Area Investigation Report. Millennium Petrochemicals, Inc., ILD005078126 – Douglas County – 041808002, Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Hwy 36 / Tuscola, Illinois. Prepared for Millennium Petrochemicals. Prepared by Clayton Group Services, Inc. Dated July 29, 2003.
- Addendum to the Final Environmental Indicators Report, Assessment of Additional Areas of Concern. Millennium Petrochemicals, Inc. ILD005078126 – Douglas County – 0418080002 Equistar Chemicals, L.P. – Tuscola Plant 625 East US Highway 36, Tuscola, Illinois. Prepared for Millennium Petrochemicals, Inc. Prepared by ENVIRON International Corporation. Dated February 26, 2004.
- Corrective Measures Workplan. Millennium Petrochemicals, Inc. ILD005078126 – Douglas County – 0418080002. Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Highway 36, Tuscola, Illinois. Prepared for Millennium Petrochemicals, Inc. Prepared by ENVIRON International Corporation. Dated August 19, 2004
- RCRA Facility Investigation Report. Millennium Petrochemicals, Inc., ILD005078126 – Douglas County – 0418080002, Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Highway 36, Tuscola, Illinois. Prepared for



Millennium Petrochemicals, Inc. Prepared by ENVIRON International Corporation. Dated August 19, 2004

- MW03S Area Summary Report, Millennium Petrochemicals, Inc., ILD005078126 – Douglas County – 0418080002, Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Highway 36, Tuscola, Illinois. Prepared for Millennium Petrochemicals, Inc. Prepared by ENVIRON International Corporation. Dated October 19, 2004.
- COMPREHENSIVE SITE INVESTIGATION/REMEDIATION OBJECTIVE REPORT ILD005078126 – Douglas County – 0418080002, Equistar Chemicals, L.P. – Tuscola Plant, 625 East US Hwy 36 / Tuscola, Illinois, Equistar Chemical, L.P., Harry R. Walton et.al., Dated September 15, 2005.

Draft Completed by Harry R. Walton et.al. September 15, 2005



# ENVIRON

February 26, 2004

Mr. Peter R. Ramanauskas  
U.S. Environmental Protection Agency  
77 West Jackson Blvd. (DW-8J)  
Chicago, IL 60604-3590

Re: Addendum to the Final Environmental Indicators Report  
Assessment of Additional Areas of Concern  
ILD005078126  
Millennium Petrochemicals, Inc.  
Tuscola, Illinois

Dear Mr. Ramanauskas:

ENVIRON International Corporation (ENVIRON), on behalf of Millennium Petrochemicals, Inc. (MPI), is hereby submitting two copies of this Addendum to the Final Environmental Indicators Report – Assessment of Additional Areas of Concern for the Tuscola Facility.

If you have any questions or comments on the report, please contact me or Ron Hutchens at (847) 444-9200.

Sincerely,

↓  
rhutchens@environcorporation

ENVIRON International Corporation



Barbara R. Coughlin, Ph.D.  
Manager

BRC:alb

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Enclosures

cc: Michael Bramnick – MPI (one copy)  
John Watson – Gardner Carton & Douglas (one copy)  
Jason Pontnack – Equistar (two copies)  
Jeff Turner – Illinois EPA (one copy)  
Tuscola Public Library (one copy)





3/5/02

## DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

### RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA725)

#### Current Human Exposures Under Control

Facility Name: Millennium Petrochemicals, Inc. (aka Equistar)  
Facility Address: 625 East US Highway 36, Tuscola, Illinois 61953  
Facility EPA ID #: ILD 005 078 126

1. Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

  X   If yes - check here and continue with #2 below.  
       If no - re-evaluate existing data, or  
       if data are not available skip to #6 and enter "IN" (more information needed) status code.

#### **BACKGROUND**

##### **Definition of Environmental Indicators (for the RCRA Corrective Action)**

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

##### **Definition of "Current Human Exposures Under Control" EI**

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

##### **Relationship of EI to Final Remedies**

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

##### **Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

**Current Human Exposures Under Control**  
**Environmental Indicator (EI) RCRIS code (CA725)**

Page 2

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**<sup>1</sup> above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	X			VOCs & Metals - See 10/31/01 EI Report
Air (indoors) <sup>2</sup>		X		
Surface Soil (e.g., <2 ft)		X		
Surface Water		X		
Sediment	X			PAHs & Metals - See 10/31/01 EI Report
Subsurf. Soil (e.g., >2 ft)		X		
Air (outdoors)		X		
WWTP Pond Sludges	X			VOCs, PAHs, & Metals - See 10/31/01 EI Report

\_\_\_\_\_ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

\_\_\_\_\_ If unknown (for any media) - skip to #6 and enter "IN" status code.

**Rationale and Reference(s):**

1) Indoor & outdoor air; surface & subsurface soils were not expected to be contaminated due to the nature of the SWMUs. Surface water did not exceed any human health based screening levels. [See pg 6-4, Final Environmental Indicators Report, Volume 1 of 4, October 31, 2001].

2) Groundwater: closed landfill plume has not migrated far enough to adversely affect any private wells. Residential private well sampling does not show organic contamination. Two wells were flagged for Iron levels at 5100 ppb and 5400 ppb which is above the Illinois Pollution Control Board Level of 5000 ppb and is a secondary contact concern. Lead was elevated at two wells at 8.7 ppb and 13 ppb. This is above the TACO Class I GW and Illinois Pollution Control Board level of 7.5 ppb. [See pg 4-13, Final Environmental Indicators Report Vol. 1 of 4, October 31, 2001]

3) River Sediments: While the facility compared these to Region 5 Ecological Data Quality Levels for sediments and did find exceedences, I also compared their values to human health screening levels for soils

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<sup>1</sup> "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

<sup>2</sup> Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

**Current Human Exposures Under Control**  
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as a conservative step. 3 metals exceed HH soil screening levels:

- a) Arsenic at maximum downstream of 22 ppm (R5 Res Ingestion = 0.4ppm; IEPA TACO Res/Commercial/Industrial Ingestion = 11.3 ppm). All samples have positive results. 2 upstream samples at 9.4 ppm and 2.8 ppm.
- b) Beryllium at maximum downstream of 0.94 ppm (R5 & TACO Ingestion = 0.1 ppm). All samples have positive results. 2 upstream samples at 0.58 ppm and 0.32 ppm.
- c) Total Chromium at maximum downstream of 330 ppm (R5 Inhalation = 270 ppm; TACO Ingestion = 230 ppm; TACO Inhalation = 270 ppm). All samples have positive results. 2 upstream samples at 5.7 and 5.5 ppm.

5 PAHs exceeded HH soil screening levels in the WWTP outlet channel sediments:

- a) Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene exceeded residential ingestion screening levels.

4) Intermittent stream sediments: 2 metals exceed HH soil screening levels:

- a) Arsenic at maximum of 14 ppm near facility exit (residential/industrial ingestion = 11.3 ppm). Other 2 downstream samples at 9.5 ppm and 0.64 ppm (below residential/industrial ingestion = 11.3 ppm).
- b) Beryllium at maximum of 0.89 ppm (residential ingestion = 0.1 ppm) near facility exit. Other 2 downstream samples at 0.73 ppm and 0.66 ppm.

4) WWTP Lagoon Sludges: Various metals, organics above HH Screening levels, but I don't believe there are any complete pathways at this area. Of note is the presence of As, Be, and Cr above screening levels in the pond sludge as well. [For all data, see Final Environmental Indicators Report, October 31, 2001]

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3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential Human Receptors (Under Current Conditions)

<u>"Contaminated" Media</u>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food <sup>3</sup>
Groundwater	Yes	No	No	No	No	No	Yes
Air (indoors)							
Soil (surface, e.g., <2 ft)							
Surface Water							
Sediment	No	Yes	No	No	Yes	Yes	No
Soil (subsurface e.g., >2 ft)							
Air (outdoors)							
WWTP Pond Sludge	No	Yes	No	No	Yes	No	No

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.
2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("\_\_\_"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

\_\_\_ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

X If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

\_\_\_ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

- 1) Groundwater: off-site residents and the indirect food pathway. Residents might use the private-wells for gardening. There is no on-site groundwater use;

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<sup>3</sup> Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

**Current Human Exposures Under Control**  
**Environmental Indicator (EI) RCRIS code (CA725)**

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- 2) Sediment: minor potential for worker, trespasser, and/or recreational user exposure to river & intermittent stream sediment;
- 3) WWTP Pond Sludge: since contaminated sludges are at the bottom of the ponds, there should be no complete exposure pathway unless the ponds are dredged by workers (which apparently has never been done).
- 4) There is recreational use of the Kaskaskia River.

**Current Human Exposures Under Control**  
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4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **“significant”**<sup>4</sup> (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks)?

- X   If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”
- If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”
- If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

**Rationale and Reference(s):**

1) Residential groundwater well sampling did not show any significant exceedences of Illinois Pollution Control Board levels or MCLs (e.g., MCL Action Level for Lead is 15 ppb). There are no on-site uses of groundwater. Arsenic did not exceed Class I groundwater standards (50 ppb) in any private wells.

2) Sediment: While metals and organic contamination above Human-Health screening levels does exist in both river sediments and in the intermittent runoff ditch sediments, they are not considered significant because the exposure potential at these areas is considered low [i.e., sediment samples collected below water or from areas where human exposure is not significant (e.g., intermittent stream on facility property)].

3) The WWTP Pond Sludges do contain various contaminants at elevated levels; however, they are submerged at the bottom of the WWTP Ponds and subsequently there are no current exposure pathways to potential receptors such as workers or trespassers. The area is fenced off on 3 sides with only unfenced access from the Kaskaskia River. At the time of WWTP closure, the lagoons should be properly closed under federal or state agency oversight.

NOTE: Discussed site conditions and CA725 determination rationale with EPA Risk Assessor on December 4, 2001.

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<sup>4</sup> If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health Risk Assessment specialist with appropriate education, training and experience.

**Current Human Exposures Under Control**  
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5. Can the "significant" exposures (identified in #4) be shown to be within acceptable limits?

\_\_\_\_\_ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

\_\_\_\_\_ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

\_\_\_\_\_ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

**Current Human Exposures Under Control**  
**Environmental Indicator (EI) RCRIS code (CA725)**

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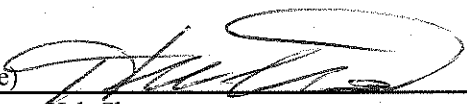
6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

  X   YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Millennium Petrochemicals (aka Equistar) facility, EPA ID # ILD 005 078 126, located at 625 East US Highway 36, Tuscola, Illinois under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

       NO - "Current Human Exposures" are NOT "Under Control."

       IN - More information is needed to make a determination.

Completed by (signature)  Date                       
(print) Peter Ramanauskas  
(title) Environmental Engineer

Supervisor (signature)  Date 3/5/02  
(print) Hak Cho  
(title) Chief, Corrective Action Section  
(EPA Region or State) Region 5, Chicago, IL

Locations where References may be found:

77 West Jackson Boulevard (DW-8J)  
Chicago, IL 60604

Tuscola Public Library, 112 E. Sale Street, Tuscola, IL 61953 (217) 253-3812

Contact telephone and e-mail numbers

(name) Peter Ramanauskas  
(phone #) (312) 886-7890  
(e-mail) ramanauskas.peter@epa.gov

**FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.**




**Allen Debus**

08/06/01 10:50 AM

To: Peter Ramanauskas/R5/USEPA/US@EPA

cc:

Subject: Re: Millennium - Draft EI Report Comments 

Peter:

I have perused through the July 27, 2001 letter in which a representative of Clayton's analytical laboratory addressed our concerns over data quality for the Millennium/Equistar project. While Clayton clarified circumstances for us, it is also clarified how numerous analytical difficulties contributed to the off spec QC data alluded to in previous correspondence.

There does seem to have been a problem with matrix interference due to presence of a substance which appeared dark in PNA/SVOC sample extracts. Unfortunately, this difficulty was not cleaned up properly in the case of PNA/SVOCs relying on good laboratory practices, with gel permeation chromatography. The interferent is referred to as a "hydrocarbon". Perhaps additional tests such as TPH might have divulged the nature of this unknown substance, especially given the nature of Millennium Petrochemicals' business. Because the hydrocarbon evidently coeluted with internal standards, the concentrations would actually be lower than reported, even though it was necessary to dilute samples - a circumstance that causes reported detection levels and observed concentrations to be elevated.

All samples intended for metals analyses (including soil samples) were digested as "wet" aliquots. In other words, Clayton did not heed Appendix Q in the QA Policy which they should have followed under terms of the Voluntary Agreement.

There is clarification that exploding samples were redigested as part of the corrective action. While the cause of this problem was not divulged, at least there was corrective action applied to the matter such that the splattering problem would not have posed additional concerns for data quality. I would be curious to know whether the soil was alkaline in nature.

While Internal Standard data isn't too bad, although out of range, much of the PAH (and one phenol result) percent recoveries were outrageously poor. This, however, is due to the dilution factors that were applied as a consequence of the unknown hydrocarbon. Metals data is generally poor, and I would attribute the poor soil QC results to Clayton's inattention to Appendix Q.

It would have been helpful if Clayton's QAPP could have been reviewed prior to implementation of the voluntary agreement. However, this isn't ordinarily done in such cases. What you now have are many data sets of qualified data, or data that is biased low, and the possibility of an unknown hydrocarbon that itself could be a major contaminant.

While you may decide much of this data can be used qualitatively for risk assessment purposes, from what little I've seen there is much about your data that belies its accuracy.

Allen

Peter Ramanauskas



**Peter Ramanauskas**

08/03/01 02:46 PM

To: Allen Debus/R5/USEPA/US@EPA

cc:

Subject: Millennium - Draft EI Report Comments



Whenever you can get to it...

Thx,

P

----- Forwarded by Peter Ramanauskas/R5/USEPA/US on 08/03/01 02:46 PM -----



**Monte Nienkerk**  
**<MNienkerk@clayton**  
**grp.com>**

08/03/01 02:09 PM

To: Peter Ramanauskas/R5/USEPA/US@EPA  
cc: JRusin@claytongrp.com  
Subject: Millennium - Draft EI Report Comments

Peter,

On July 13, 2001, you provided comments on the June 15, 2001, Draft EI Report. A number of your questions/comments related to Appendix I (Volume 3 of 3) of the report. Appendix I is the Laboratory Statement of Data Qualifications. Given this, I have asked our laboratory to reply to these questions and comments. Their reply is attached. I believe this reply addresses your questions/comments. If it is necessary to provide any further clarification, I can arrange a teleconference with our laboratory people. Please let me know if you would like me to do this.

Regards,

Monte M. Nienkerk, P.G.  
Senior Project Manager  
Clayton Group Services, Inc.  
3140 Finley Road  
Downers Grove, IL 60515

630-795-3207 voice

630-795-1130 fax

[mnienkerk@claytongrp.com](mailto:mnienkerk@claytongrp.com)



usepa.millennium.d voaqlimits.x svocqlimits.x metalsqcliimits. genchemqcliimits. holdrpt.xl



3140 Finley Road  
Downers Grove, IL 60515  
630.795.3200  
Fax 630.795.1130



*Via Federal Express No. 4857 8724 9122*

June 15, 2001

Mr. Peter R. Ramanauskas  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**  
77 West Jackson Blvd. (DW-8J)  
Chicago, IL 60604-3590

Clayton Project 15-00116.01-011

**RE: Draft Environmental Indicator (EI) Report  
ILD005078126  
Millennium Petrochemicals, Inc.  
Tuscola, Illinois**

Dear Mr. Ramanauskas:

Paragraph III.C. of the Voluntary Corrective Action Agreement between the USEPA and Millennium Petrochemicals, Inc. (MPI), dated September 29, 2000, requires that by June 15, 2001 MPI will submit to USEPA a draft report which documents its efforts to meet the requirements of that paragraph. Clayton Group Services, Inc. (Clayton), on behalf of MPI, is today submitting two (2) copies of the Draft Environmental Indicators (EI) Report for the facility located in Tuscola, Illinois, as required by the Agreement.

Completed draft EI Forms are included as Appendix A of the Draft EI report. It should be noted that both the Current Human Exposures Under Control (CA725) form and the Migration of Contaminated Groundwater Under Control (CA750) form have been checked "IN" (more information is needed to make a determination).

The recently completed RCRA Facility Investigation (RFI) identified the need for additional data with respect to the evaluation of Kaskaskia River sediment and groundwater. Specifically:

- The sediment sample collected from the outlet channel from the facility to the Kaskaskia River contains individual PAHs above sediment screening levels. Furthermore, the total low molecular weight PAHs found in the furthest downstream sediment sample was above the screening value for total low molecular weight PAHs

15-00116ca043.doc\MMN



Mr. Peter R. Ramanauskas  
U.S. EPA  
Millennium / Tuscola, IL

Clayton Project 15-00116.01  
June 15, 2001  
Page 2

although no individual PAHs were found in this sample above screening levels. Therefore, it is proposed to collect additional sediment samples in these two areas. These sediment samples would only be analyzed for PAHs.

- Groundwater samples collected from one shallow monitoring well (located in the area of the wastewater treatment ponds) was the only shallow monitoring well where potential VOCs of concern were detected. Benzene, chloroform, cis-1,2-dichloroethene, and vinyl chloride were detected at concentrations above screening levels. To further evaluate this area, it is proposed to install an additional shallow monitoring well.
- The RFI has provided supporting data concerning the groundwater divide located on the east side of the site within the shallow groundwater zone. Data collected during the RFI suggest that the divide may extend to the deeper groundwater zone; however, there is a lack of data points on the east side of the divide (into the deeper groundwater zone) to confirm this. It is proposed to install an additional deep monitoring well on the east side of the landfills. The analysis of groundwater samples from this well will also allow for the further evaluation of the occurrence of boron in the groundwater.
- Some of the potential contaminants of concern identified in the groundwater were detected during one sampling event but not the other. Therefore, to obtain a better understanding of groundwater conditions, it is proposed to complete an additional round (third round) of groundwater sampling. This sampling event would occur after the additional shallow and deep monitoring wells have been installed.
- The RFI identifies that residents in the area of the site obtain their potable water supply from wells. Many of these wells are less than 100 feet deep and withdraw water from the same formation as the deep RFI monitoring wells. Data collected from the deep monitoring wells suggest that there may be a regional presence of elevated concentration levels of chloroform and boron, and a local presence of elevated iron and manganese. Because of this, it is proposed to sample residential wells in the area.

A scope of work (SOW) outlining this proposed additional data collection is provided as Appendix N of the Draft EI Report. The field activities for these data collection activities should be completed by the end of August, with the laboratory analytical data received by the end of September. Depending on the results of the additional data collection, this will mean that the EI Report can not be finalized before the end of October, at the earliest.





Mr. Peter R. Ramanauskas  
U.S. EPA  
Millennium / Tuscola, IL

Clayton Project 15-00116.01  
June 15, 2001  
Page 3

The need for the collection of additional data also calls into question the ability to propose the final corrective measure(s) by January 31, 2002, as required by paragraph III.D. of the Agreement. As you discussed with Monte Nienkerk during a telephone conversation on June 11, 2001, the USEPA will consider revising the deliverable dates provided in the Agreement based on the additional data needs. We would like to discuss this with you further, after you have had a chance to review the Draft EI Report.

Should you have any questions, please contact me at 630/795-3208 or Monte Nienkerk at 630/795-3207.

Sincerely,

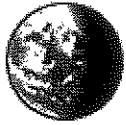


**Ronald B. St. John, P.G.**  
Vice President, Midwest Regional Director  
Environmental Services

Enclosure: Draft RFI Report (2 copies)

cc: John Rice, Millennium Petrochemicals, Inc.  
Tom Dimond, Mayer, Brown & Platt  
Chris Bland, Equistar  
Jeff Turner, Illinois EPA – Champaign





Monte Nienkerk  
<MNienkerk@clayton  
grp.com>

To: Peter Ramanauskas/R5/USEPA/US@EPA  
cc: RStjohn@claytongrp.com  
Subject: Re: Env. Indicators

05/18/01 12:11 PM

Hi Peter,

I would like to discuss the EI reports with you. You asked if it will be possible to show a "yes" determination for CA725 (Human Health) by the draft EI report due date of June 15th. To do this would require that residential well sampling be completed and that the results would show that there are no impacts to the residential wells by June 15. This is not possible. It may be possible to have this completed by the time the final EI report is due (July 31). Please give me a call, at your convenience to discuss. Thanks.

Regards,

Monte M. Nienkerk, P.G.  
Senior Project Manager  
Clayton Group Services, Inc.  
3140 Finley Road  
Downers Grove, IL 60515

X 630-795-3207 voice  
630-795-1130 fax

mnienkerk@claytongrp.com

>>> <Ramanauskas.Peter@epamail.epa.gov> 05/16 10:18 AM >>>  
Gentlemen,

I had a chance to brief Hak about what we had discussed during our meeting on Monday (May 14); specifically, regarding the EI determination date of July 31st.

While we have no problems with your desire to collect additional GW data for support purposes, we must stress the importance of adherence to the agreed upon final EI determination dates.

I mentioned during our meeting that we would look at the information presented in your draft EI report and use that information to assess the appropriateness of an extension to the final EI dates. Our concern is that we do not want to find ourselves in a situation where there are continual delays due to the need for further sampling.

I wanted to remind you of our position that the EI final determination dates in the voluntary agreement are critical milestones which may be changed only under special circumstances.

While there is some question about the groundwater EI (CA750) at this time, do you believe that you would be able to show a "yes" determination for CA725 (Human Health) by the draft EI report due date of June 15th?

Please let me know if you have any questions,  
Peter

Called Jerry Willman, IEPA (202) 524-6365  
for Private well Sampling SOP

Call Monte Mon.



// Signed 2/5/99 //

MEMORANDUM

SUBJECT: Interim-Final Guidance for RCRA Corrective Action Environmental Indicators

FROM: Elizabeth Cotsworth, Acting Director  
Office of Solid Waste

TO: RCRA Senior Policy Managers  
Regions I-X

The RCRA corrective action program and achievement of its Government Performance Results Act (GPRA) goals are of highest priority for the national RCRA program. The RCRA program is using two Environmental Indicators (EI) to measure program performance for GPRA purposes: (1) Current Human Exposures Under Control (CA725), and (2) Migration of Contaminated Groundwater Under Control (CA750).

With this memorandum I am transmitting revised guidance on how to determine if a facility has met the RCRA corrective action Environmental Indicators (EI). This Interim-Final guidance will replace the existing EI guidance (from 1994 and 1995) and will remain the working guidance for at least one year. The Interim-Final guidance is similar to the earlier guidance but has been modified to facilitate more consistent determinations (across regions and states) and to be more explicit with regard to the minimum level of documentation required to ensure that the determinations will be verifiable.

This guidance has been developed with the cooperation and input of representatives from all ten EPA regions and at least one state from each region. The guidance is in the form of questions to be answered in making an EI determination. The questions and answer options express the minimum criteria for EI determinations and are not to be modified for regional, state or site-specific conditions. The "Rationale" portion of the forms can be filled in to explain unique situations to any length necessary. While the signed hard-copies of these forms should reside in the facility's administrative files, these forms should also be kept in electronic format that can be posted on an "EI database" web site to be developed by the Office of Solid Waste in the near future. The "EI database" will help communicate successes and provide examples for overcoming barriers to progress.

Thank you for your assistance with this important effort. If you have any questions, please call Bob Hall or Henry Schuver of my staff at (703) 308-8432 or 308-8656 respectively.

Attachment



**Comments & Data Review on Addendum to the Final Environmental Indicators Report**  
**Assessment of Additional Areas of Concern**  
**Millennium Petrochemicals, Inc. (ILD 005 078 126)**  
**Tuscola, IL**

**GENERAL COMMENTS:** The text of the report is missing explanation of much information presented in the lab data sheets on detected hydrocarbons, elevated PID readings, and boring log information. The data shows many instances of "unknown hydrocarbon" contamination resulting in elevated sample dilution factors and reporting limits, yet none of this information is presented in the report nor are the effects of this on the accuracy of the reported data discussed. The report's silence on this gives the impression that there was limited contamination discovered during this sampling event when this may not be the case. There appears to be a petroleum hydrocarbon contamination issue in many of these areas which will need further discussion and exploration. Samples for which there were elevated PID readings with no samples taken, where PID readings were elevated but analytical organics analysis did not reveal contamination, and/or samples with TICs identified should be discussed in the report along with proposed next steps to fully and comprehensively delineate the contamination present at those locations. Millennium/Environ should propose a procedure for identification of unknown hydrocarbons. Areas where there was the presence of a hydrocarbon resulting in elevated PID readings or causing dilution of the sample for analysis should be revisited to identify what the hydrocarbon is and delineate its extent. *- Diesel, Gasoline, Products*

Present an explanation of data where high dilution factors caused reporting limits to be elevated beyond TACO screening levels, what is driving the need for dilution, and what is proposed for those areas where reporting limits were elevated beyond TACO screening levels.

Figures/tables should be adjusted as necessary to include this information as well as inclusion of proposed steps for further investigation where required. Groundwater sampling for nature and extent should be proposed in areas where migration to groundwater values have been exceeded and where contaminants were detected in saturated samples. Proposed next steps for each area should be mentioned in the appropriate subsections of Section 2.0 and Section 3.0.

Deviations from sampling plans/locations for each area should be discussed along with rationale for the changes. Explanation of reasons for additional samples added in each area should be included in the appropriate sections. A description of the activities and processes that took place at the newly added areas (Former Ethyl Chloride Unit, Former Tubular Water Reactor Area, and North Uploading Spot) should be added along with rationales for sampling locations/depths and analytical constituent selection at these areas.

This report should be rewritten and presented as a RFI Phase I report for this area and not simply an Addendum to the Environmental Indicators report (although, revisiting the EI is certainly appropriate with the new data available and can be presented in its own section).

**Former Extraction Process Area**

Lab data sheets report unknown hydrocarbons and other various hydrocarbons (e.g., cyclopentanes/cyclohexanes) as detected via Method 8260. For example, EX08 shows various isomers of cyclohexane in the 10's of PPM with a Dilution Factor of 45 raising the RL for BTEX. There should be a discussion of this in the report for this area and all areas where this occurred.

**Former Fractionation Process Area**

Environ proposes additional sampling around FP08 and FP10 to vertically delineate PAH. Agreed. Prepare a new sampling plan and add wells to look at GW for PAH. Also, revisit the hydrocarbon issue as noted in previous comments.



Former Ethylene Production Area BTEX + PAH + Ni

Section 2.3 states that for each sample, it was determined whether a subset or a full suite of analysis was necessary. Why was this done? If it is a deviation from the workplan provide explanation for doing so. Environ states additional sampling may be needed to further delineate. Agreed. Prepare a new sampling plan and consider groundwater wells. Revisit the hydrocarbon issue as noted in previous comments.

Former Polyethylene Production Area (Should be BTEX, VOC, PAH) <sup>also</sup>

Environ states additional sampling near boring PE13 may be needed to confirm the absence of free product in the PE Area. Agreed. Wells should be drilled here to check for DNAPL and sample water for organics. Additional bounding on east side, west of PE31, and south of PE17D will be required. Revisit the hydrocarbon issue as noted in previous comments.

Former Agricultural Chemical Production Area Various

Section 2.5 states that samples were analyzed for arsenic, ammonia, nitrate and nitrite as nitrogen, phosphorous, pH, PAH, SVOC, sulfate, vanadium, and VOC. Provide explanation on why not all samples were run for all of these constituents.

Environ states that further sampling is not needed here. What does Millennium/Environ propose for exceedences of TACO SROs? Sulfate exceeds Migration to Class II GW. Arsenic exceeds ingestion SROs for Industrial/Commercial and Construction worker.

Revisit the hydrocarbon issue as noted in previous comments. AG17 boring log notes sheen and visible contamination at 9 feet. No VOC analysis done on this sample.

Former Fire Training Grounds (BTEX, VOC, PAH, PCB, lead)

According to boring log for FT13 there was no sample taken at due to PID failure. But the log notes petroleum odor at 4.6 feet. A sample should have been taken here regardless of PID failure. The area around FT13 should be revisited. The area of PCB around FT10 should be delineated.

Sample FT15 has high dilution factor (40.8 at 6-8 ft and 45 at 12 to 14 ft) with elevated unknown hydrocarbons and high PID readings. Explain the difference between Scan PID and Headspace PID as noted in the boring logs. Why were the samples outside the Former Fire Training grounds added (FT13 to FT17) and why was nickel analyzed for instead of lead in certain cases?

Why were samples here analyzed for what looks to be an abbreviated list of SVOCs versus other areas? PAH only. PNAC via Method 8270C was done here (as well as other areas).

Revisit the hydrocarbon issue as noted in previous comments.

Former Polymer Pilot Plant Area (BTEX, VOC, PAH) <sup>Bounding Dep 7th</sup>

Section 2.7 states that further sampling is not necessary in this area. What is the rationale for this statement? The organics do not appear to be bounded in all directions around non-saturated and saturated soil samples. Groundwater wells will need to be installed to determine extent of any impacts to the groundwater in this area. We may need to look for DNAPL product here (and any other areas with similar VOC contaminants). Millennium should propose steps for additional investigation of soil and groundwater here.



Figure 8a shows <SSL for a 4 – 6 ft depth at PP08, but the analytical results for this sample depth show elevated levels of unknown hydrocarbons (10s of ppm). See previous comments related to unknown hydrocarbons. Other samples in this area also show elevated unknown hydrocarbons.

Sampling depths seem to vary from the sampling approach presented in Section 9.0 of the March 28, 2003 workplan. PP07 shows depth to subsurface feature at 2-8ft, but sample at PP07 only bored/taken at 0-1 foot interval. PP04 bored to 16 feet but only one sample at 6-8 ft taken. Provide explanation for deviation from the workplan sampling depths for this and any other areas at the facility.

#### Chemical Loading Area

*- Benzene Inhalation workers 54 ppm  
04*

The report concludes that additional sampling may be needed around CL17 to delineate benzene. There are many other locations where no samples were taken (CL03, CL07, etc.) which showed elevated PID readings. All areas of exceedences for organics and metals will need delineation. What does Millennium/Environ propose for exceedences of TACO SROs?

#### Former Ethyl Chloride Unit

EC02 has cyclohexane tentatively identified at 150ppm (the USEPA Region 9 Industrial PRG = 140 ppm soil saturation). Revisit hydrocarbon issue in this area as noted in previous comments.

Many deep borings do not have a surface soil sample taken (e.g., many start at 2-4 ft). If this is a deviation from the workplan, provide explanation. Sample EC04 notes visual contamination at 4.5 ft but no sample taken. Figure 10 notes that an EC10 sample was taken at 4 to 6 feet while the boring logs and data packages show a sample taken at 2 to 4 feet.

The report states that no further sampling is necessary at this unit. What are the proposed next steps for this unit for areas above TACO Tier I levels and areas where contamination remains undefined? We will need additional sampling and bounding of contamination for TPH/COCs (e.g., EC11 boring log shows PID pegged at 2000+ within 0 to 5 feet, grey/black odor at 3 feet, wet at 4 feet. PID remains high down to 8 feet. No samples taken at this location.)

#### Former Tubular Water Reactor Area

Multiple borings with here have elevated PID readings and hydrocarbons being reported. Will need to revisit hydrocarbon issue here as per previous comments.

What does Millennium/Environ propose for next steps for this unit as DCE, PCE, and TCE have been identified as PCOCs? There may be a DNAPL source due to TCE, PCE, etc.

#### North Unloading Spot

All four soil borings taken here show headspace PID readings fairly consistently at 2000+ along entire depth of boring. Revisit the hydrocarbon issue here as noted in previous comments.





Peter  
Ramanauskas/R5/USEPA/U  
S

To  
Subject Comments on Addendum to Final EI Report

05/07/04 04:09 PM

Gentlemen,

Attached please find comments on the Addendum to the Final Environmental Indicators Report Assessment of Additional Areas of Concern dated February 26, 2004 for the Millennium Tuscola, IL facility.

Please let me know if you would like a formal hardcopy or if this will suffice.

Looking forward to meeting you on the 13th.

Thanks,  
Peter



Equistar New Areas Data Review Comments.wpd



## DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

### RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA725)

#### Current Human Exposures Under Control

Facility Name: Millennium Petrochemicals, Inc. (aka Equistar)  
Facility Address: 625 East US Highway 36 , Tuscola, Illinois 61953  
Facility EPA ID #: ILD 005 078 126

1. Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?

X If yes - check here and continue with #2 below.  
\_\_\_\_\_ If no - re-evaluate existing data, or  
\_\_\_\_\_ if data are not available skip to #6 and enter "IN" (more information needed) status code.

#### **BACKGROUND**

##### **Definition of Environmental Indicators (for the RCRA Corrective Action)**

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

##### **Definition of "Current Human Exposures Under Control" EI**

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

##### **Relationship of EI to Final Remedies**

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

##### **Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

**Current Human Exposures Under Control**  
**Environmental Indicator (EI) RCRIS code (CA725)**

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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be “contaminated”<sup>1</sup> above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	X			VOCs & Metals - See 10/31/01 EI Report
Air (indoors) <sup>2</sup>		X		
Surface Soil (e.g., <2 ft)		X		
Surface Water		X		
Sediment	X			PAHs & Metals - See 10/31/01 EI Report
Subsurf. Soil (e.g., >2 ft)		X		
Air (outdoors)		X		
WWTP Pond Sludges	X			VOCs, PAHs, & Metals - See 10/31/01 EI Report

\_\_\_\_\_ If no (for all media) - skip to #6, and enter “YE,” status code after providing or citing appropriate “levels,” and referencing sufficient supporting documentation demonstrating that these “levels” are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each “contaminated” medium, citing appropriate “levels” (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

\_\_\_\_\_ If unknown (for any media) - skip to #6 and enter “IN” status code.

**Rationale and Reference(s):**

1) Indoor & outdoor air; surface & subsurface soils were not expected to be contaminated due to the nature of the SWMUs. Surface water did not exceed any human health based screening levels. [See pg 6-4, Final Environmental Indicators Report, Volume 1 of 4, October 31, 2001].

2) Groundwater: closed landfill plume has not migrated far enough to adversely affect any private wells. Residential private well sampling does not show organic contamination. Two wells were flagged for Iron levels at 5100 ppb and 5400 ppb which is above the Illinois Pollution Control Board Level of 5000 ppb and is a secondary contact concern. Lead was elevated at two wells at 8.7 ppb and 13 ppb. This is above the TACO Class I GW and Illinois Pollution Control Board level of 7.5 ppb. [See pg 4-13, Final Environmental Indicators Report Vol. 1 of 4, October 31, 2001]

3) River Sediments: While the facility compared these to Region 5 Ecological Data Quality Levels for sediments and did find exceedences, I also compared their values to human health screening levels for soils

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<sup>1</sup> “Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based “levels” (for the media, that identify risks within the acceptable risk range).

<sup>2</sup> Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

**Current Human Exposures Under Control**  
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as a conservative step. 3 metals exceed HH soil screening levels:

- a) Arsenic at maximum downstream of 22 ppm (R5 Res Ingestion = 0.4ppm; IEPA TACO Res/Commercial/Industrial Ingestion = 11.3 ppm). All samples have positive results. 2 upstream samples at 9.4 ppm and 2.8 ppm.
- b) Beryllium at maximum downstream of 0.94 ppm (R5 & TACO Ingestion = 0.1 ppm). All samples have positive results. 2 upstream samples at 0.58 ppm and 0.32 ppm.
- c) Total Chromium at maximum downstream of 330 ppm (R5 Inhalation = 270 ppm; TACO Ingestion = 230 ppm; TACO Inhalation = 270 ppm). All samples have positive results. 2 upstream samples at 5.7 and 5.5 ppm.

5 PAHs exceeded HH soil screening levels in the WWTP outlet channel sediments:

- a) Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene exceeded residential ingestion screening levels.

4) Intermittent stream sediments: 2 metals exceed HH soil screening levels:

- a) Arsenic at maximum of 14 ppm near facility exit (residential/industrial ingestion = 11.3 ppm). Other 2 downstream samples at 9.5 ppm and 0.64 ppm (below residential/industrial ingestion = 11.3 ppm).
- b) Beryllium at maximum of 0.89 ppm (residential ingestion = 0.1 ppm) near facility exit. Other 2 downstream samples at 0.73 ppm and 0.66 ppm.

4) WWTP Lagoon Sludges: Various metals, organics above HH Screening levels, but I don't believe there are any complete pathways at this area. Of note is the presence of As, Be, and Cr above screening levels in the pond sludge as well. [For all data, see Final Environmental Indicators Report, October 31, 2001]

**Current Human Exposures Under Control**  
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3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

	Potential <u>Human Receptors</u> (Under Current Conditions)						
<u>"Contaminated" Media</u>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food <sup>3</sup>
Groundwater	Yes	No	No	No	No	No	Yes
Air (indoors)							
Soil (surface, e.g., <2 ft)							
Surface Water							
Sediment	No	Yes	No	No	Yes	Yes	No
Soil (subsurface e.g., >2 ft)							
Air (outdoors)							
WWTP Pond Sludge	No	Yes	No	No	Yes	No	No

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.
2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("\_\_\_"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- \_\_\_ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- X If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.
- \_\_\_ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

- 1) Groundwater: off-site residents and the indirect food pathway. Residents might use the private-wells for gardening. There is no on-site groundwater use;

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<sup>3</sup> Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)



**Current Human Exposures Under Control**  
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- 2) Sediment: minor potential for worker, trespasser, and/or recreational user exposure to river & intermittent stream sediment;
- 3) WWTP Pond Sludge: since contaminated sludges are at the bottom of the ponds, there should be no complete exposure pathway unless the ponds are dredged by workers (which apparently has never been done).
- 4) There is recreational use of the Kaskaskia River.

**Current Human Exposures Under Control**  
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4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be “significant”<sup>4</sup> (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks)?

- X   If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”
- If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”
- If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

**Rationale and Reference(s):**

- 1) Residential groundwater well sampling did not show any significant exceedences of Illinois Pollution Control Board levels or MCLs (e.g., MCL Action Level for Lead is 15 ppb). There are no on-site uses of groundwater. Arsenic did not exceed Class I groundwater standards (50 ppb) in any private wells.
- 2) Sediment: While metals and organic contamination above Human-Health screening levels does exist in both river sediments and in the intermittent runoff ditch sediments, they are not considered significant because the exposure potential at these areas is considered low [i.e., sediment samples collected below water or from areas where human exposure is not significant (e.g., intermittent stream on facility property)].
- 3) The WWTP Pond Sludges do contain various contaminants at elevated levels; however, they are submerged at the bottom of the WWTP Ponds and subsequently there are no current exposure pathways to potential receptors such as workers or trespassers. The area is fenced off on 3 sides with only unfenced access from the Kaskaskia River. At the time of WWTP closure, the lagoons should be properly closed under federal or state agency oversight.

NOTE: Discussed site conditions and CA725 determination rationale with EPA Risk Assessor on December 4, 2001.

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<sup>4</sup> If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health Risk Assessment specialist with appropriate education, training and experience.

**Current Human Exposures Under Control**  
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5. Can the "significant" exposures (identified in #4) be shown to be within acceptable limits?

\_\_\_\_\_ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

\_\_\_\_\_ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

\_\_\_\_\_ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

**Current Human Exposures Under Control**  
**Environmental Indicator (EI) RCRIS code (CA725)**

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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

  X   YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Millennium Petrochemicals (aka Equistar) facility, EPA ID # ILD 005 078 126, located at 625 East US Highway 36, Tuscola, Illinois under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

       NO - "Current Human Exposures" are NOT "Under Control."

       IN - More information is needed to make a determination.

Completed by    (signature) \_\_\_\_\_ Date \_\_\_\_\_  
                  (print)        Peter Ramanauskas  
                  (title)        Environmental Engineer

Supervisor      (signature) \_\_\_\_\_ Date \_\_\_\_\_  
                  (print)        Hak Cho  
                  (title)        Chief, Corrective Action Section  
                  (EPA Region or State)    Region 5, Chicago, IL

Locations where References may be found:

77 West Jackson Boulevard (DW-8J)  
Chicago, IL 60604

Tuscola Public Library, 112 E. Sale Street, Tuscola, IL 61953 (217) 253-3812

Contact telephone and e-mail numbers

(name)            Peter Ramanauskas  
(phone #)        (312) 886-7890  
(e-mail)         ramanauskas.peter@epa.gov

**FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.**

3140 Finley Road  
Downers Grove, IL 60515  
630.795.3200  
Fax 630.795.1130



*Via Federal Express No. 4857 8725 7451*

October 31, 2001

Mr. Peter R. Ramanauskas  
**U.S. ENVIRONMENTAL PROTECTION AGENCY**  
77 West Jackson Blvd. (DW-8J)  
Chicago, IL 60604-3590

Clayton Project 15-00116.03-005

**RE: Environmental Indicator (EI) Report**  
**ILD005078126**  
**Millennium Petrochemicals, Inc.**  
**Tuscola, Illinois**

Dear Mr. Ramanauskas:

Clayton Group Services, Inc. (Clayton), on behalf of Millennium Petrochemicals, Inc. (MPI), is submitting two (2) copies of the Environmental Indicators (EI) Report for the facility located in Tuscola, Illinois, as required by the Voluntary Corrective Action Agreement, dated September 29, 2000.

Completed EI Forms are included in Appendix A of the EI report. We believe that based on the recently completed RCRA Facility Investigation (RFI) that both the Current Human Exposures Under Control (CA725) form and the Migration of Contaminated Groundwater Under Control (CA750) form can be marked "yes" indicating that these determinations have been verified.

It should be noted that sediment samples collected from the outlet channel from the facility to the Kaskaskia River and from the Kaskaskia River contain PAHs above ecological sediment screening levels. The risk posed by this will be evaluated as part of the Corrective Measures Study.

The need to evaluate this risk calls into question the ability to propose the final corrective measure(s) by January 31, 2002, as required by paragraph III.D. of the Agreement. As we have previously discussed, it is our understanding that the USEPA will consider revising this deliverable date.

15-00116ca069.doc\MMN



Mr. Peter R. Ramanauskas  
U.S. EPA  
Millennium / Tuscola, IL

Clayton Project 15-00116.03  
October 31, 2001  
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Should you have any questions, please contact me at 630/795-3208 or Monte Nienkerk at 630/795-3207.

Sincerely,



**Ronald B. St. John, P.G.**  
Vice President, Midwest Regional Director  
Environmental Services

Enclosure: EI Report (2 copies)

cc: John Rice, Millennium Petrochemicals, Inc. (1 copy)  
Tom Dimond, Mayer, Brown & Platt (1 copy)  
Chris Bland, Equistar (2 copies)  
Jeff Turner, Illinois EPA – Champaign (1 copy)  
Tuscola Public Library (1 copy)





### Equistar/Millennium CA725 EI Determination

Equistar/Millennium has performed and RFI investigation of SWMUs/AOIs identified in a 1988 RFA performed by the Agency.

Most of the units were closed under IEPA supervised work. However, for the purposes of corrective action completion and EI determination, Equistar entered into a Voluntary Corrective Action agreement to address remaining EPA concerns. The remaining areas of interest included: WWTP aeration lagoons/sludges, closed and capped landfill groundwater plume, intermittent stream sediment, and Kaskaskia river surface water and sediment quality.

In completing the CA725 determination form using the data obtained from the RFI investigation, the following conditions exist:

- Contaminated media include: groundwater, sediment, and WWTP pond sludges are contaminated above human health risk levels for certain constituents.
- Complete pathways for:
  - 1) Groundwater: off-site residents and the indirect food pathway. Residents might use the private-wells for raising crops. There is no on-site groundwater use;
  - 2) Sediment: minor potential for worker exposure to river & intermittent stream sediment, trespassers, recreation; and
  - 3) WWTP Pond Sludge: since contaminated sludges are at the bottom of the ponds, there should be no complete exposure pathway unless the ponds are dredged by workers (which apparently has never been done).
- Contaminant levels:
  - 1) Groundwater: closed landfill plume has not migrated far enough to adversely affect any private wells. Residential private well sampling does not show organic contamination. Two wells were flagged for Iron levels at 5100 ppb and 5400 ppb which is above the Illinois Pollution Control Board Level of 5000 ppb and is a secondary contact concern. Lead was elevated at two wells at 8.7 ppb and 13 ppb. This is above the TACO Class I GW and Illinois Pollution Control Board level of 7.5 ppb.
  - 2) River Sediments: 3 metals exceed HH screening levels:
    - a) Arsenic at maximum downstream of 22 ppm (R5 Res Ingestion = 0.4ppm; IEPA TACO Res/Commercial/Industrial Ingestion = 11.3 ppm. Note: TACO value considers state background levels for arsenic). All samples have positive results. 2 upstream samples at 9.4 ppm and 2.8 ppm.

b) Beryllium at maximum downstream of 0.94 ppm (R5 & TACO Ingestion = 0.1 ppm). All samples have positive results. 2 upstream samples at 0.58 ppm and 0.32 ppm.

c) Total Chromium at maximum downstream of 330 ppm (R5 Inhalation = 270 ppm; TACO Ingestion = 230 ppm; TACO Inhalation = 270 ppm). All samples have positive results. 2 upstream samples at 5.7 and 5.5 ppm.

3) Intermittent stream sediments: 2 metals exceed HH screening levels:

a) Arsenic at maximum of 14 ppm near facility exit. Other 2 downstream samples at 9.5 ppm and 0.64 ppm.

b) Beryllium at maximum of 0.89 ppm near facility exit. Other 2 downstream samples at 0.73 ppm and 0.66 ppm.

4) WWTP Lagoon Sludges: Various metals, organics above HH Screening levels, but I don't believe there are any complete pathways at this area. Of note is the presence of As, Be, and Cr above screening levels in the pond sludge as well.

A CA725 determination seems possible here.

Reviewed with Mario Mangino on December 4<sup>th</sup>, 2001. CA725 is a YE. Next steps in corrective action will be discussed with the facility and work will proceed.

Facility Name: \_\_\_\_\_

EPA ID#: \_\_\_\_\_

City/State: \_\_\_\_\_

## CURRENT HUMAN EXPOSURES UNDER CONTROL (CA 725)

Level

